

CLAIMS

What is claimed is:

1 **1.** A pipeline mapping system comprising:

2 a mapping probe on a probe conveyor that is extendable into a lateral
3 pipeline from a base vehicle in a main pipeline;

4 the base vehicle has a vehicle motor for propulsion of the base vehicle
5 in the main pipeline selectively;

6 the probe conveyor has a probe motor for propulsion of the probe
7 conveyor with the mapping probe thereon in the lateral pipeline; and

8 a mapping recorder in electronic communication with the mapping
9 probe from a predetermined remote position for recording predetermined mapping
10 information from the mapping probe.

1 **2.** The pipeline mapping system of claim 1 wherein:

2 the mapping probe includes predetermined metallic mass; and

3 the mapping recorder includes a predetermined metal locator for
4 marking position of the mapping probe from above ground in which the mapping
5 probe is positioned.

1 **3.** The pipeline mapping system of claim 1 wherein:

2 the base vehicle includes predetermined metallic mass; and

3 the mapping recorder includes a predetermined metal locator for
4 marking position of the base vehicle from above ground in which the base vehicle
5 is positioned.

1 4. The pipeline mapping system of claim 1 wherein:
2 the mapping probe includes a predetermined electronic emitter; and
3 the mapping recorder includes a predetermined electronic probe
4 receiver for marking position of the mapping probe from above ground in which the
5 mapping probe is positioned.

6 5. The pipeline mapping system of claim 1 wherein:
7 the base vehicle includes a predetermined electronic vehicle emitter; and
8 the mapping recorder includes a predetermined electronic receiver for
9 marking position of the base vehicle from above ground in which the base vehicle
10 is positioned.

11 6. The pipeline mapping system of claim 1 wherein:
12 the mapping recorder includes a computer having graphics-producing
13 capability for mapping positions of the mapping probe on a graphic map for
14 communication to a computer printer for computer printout.

1 7. The pipeline mapping system of claim 6 wherein:
2 the mapping recorder includes a computer monitor having graphics-
3 display capability for displaying graphics produced by the computer.

1 **8.** The pipeline mapping system of claim **1** wherein:

2 the mapping probe includes a probe TV camera with appropriate
3 lighting for video transmission of physical conditions and structure of the main
4 pipeline and the lateral pipeline.

1 **9.** The pipeline mapping system of claim **8** wherein:

2 the mapping recorder includes an on-site TV monitor for displaying the
3 physical conditions and structure of the main pipeline and the lateral pipeline.

1 **10.** The pipeline mapping system of claim **1** wherein:

2 the base vehicle includes a base TV camera with appropriate lighting
3 for aiding video transmission of physical conditions and structure of the main
4 pipeline and the lateral pipeline in addition to video transmission of the mapping
5 probe.

1 **11.** The pipeline mapping system of claim **10** wherein:

2 the mapping recorder includes an on-site TV monitor for displaying the
3 physical conditions and structure of the main pipeline and the lateral pipeline in
4 addition to the mapping probe.

1 **12.** The pipeline mapping system of claim **1** wherein:

2 the base vehicle includes a probe manipulator from which the probe
3 conveyor is extendable into the lateral pipeline from the base vehicle.

1 **13.** The pipeline mapping system of claim **12** wherein:

2 the base vehicle includes a TV camera with appropriate lighting for
3 video aiding transmission of physical conditions and structure of the main pipeline
4 and the lateral pipeline in addition to video transmission of the mapping probe;

5 the mapping recorder includes an on-site TV monitor for displaying the
6 physical conditions and structure of the main pipeline and the lateral pipeline in
7 addition to the mapping probe; and

8 the probe manipulator has electronic manipulation controls that are
9 operable remotely with a probe controller for controlling activity of the mapping
10 probe selectively in relation to video display on the on-site TV monitor.

1 **14.** The pipeline mapping system of claim **1** wherein:

2 the vehicle motor includes a vehicle water jet to which pressurized
3 water is supplied from a water conveyance having an inlet end proximate a motor
4 end of the base vehicle.

1 **15.** The pipeline mapping system of claim **14** wherein:

2 the vehicle water jet has jet-nozzle structure and position to dislodge
3 visual obstruction from internal periphery of the main pipeline.

1 **16.** The pipeline mapping system of claim 1 wherein:

2 the probe motor includes a probe water jet to which pressurized water
3 is supplied from a water conveyance having an inlet end proximate the motor end
4 of the base vehicle.

1 **17.** The pipeline mapping system of claim 16 wherein:

2 the probe water jet has jet-nozzle structure and position to dislodge
3 visual obstruction from internal periphery of the lateral pipeline.

1 **18.** A pipeline mapping system comprising:

2 a mapping probe on a probe conveyor that is extendable into a lateral
3 pipeline from a base vehicle in a main pipeline;

4 the base vehicle has a vehicle motor for propulsion of the base vehicle
5 in the main pipeline selectively;

6 the prove conveyor has a probe motor for propulsion of the probe
7 conveyor with the mapping probe thereon in the lateral pipeline;

8 a mapping recorder in electronic communication with the mapping
9 probe from a predetermined remote position for recording predetermined mapping
10 information from the mapping probe;

11 the mapping probe includes a predetermined metallic mass;

12 the mapping recorder includes a predetermined metal locator for
13 marking position of the mapping probe from above ground in which the mapping
14 probe is positioned;

15 the base vehicle includes a predetermined metallic mass;

16 the mapping recorder includes a predetermined metal locator for
17 marking position of the base vehicle from above ground in which the base vehicle
18 is positioned;

19 the mapping probe includes a predetermined electronic emitter;

20 the mapping recorder includes a predetermined electronic receiver for
21 marking position of the mapping probe from above ground in which the mapping
22 probe is positioned;

23 the base vehicle includes a predetermined electronic emitter;

24 the mapping recorder includes a predetermined electronic receiver for
25 marking position of the base vehicle from above ground in which the base vehicle
26 is positioned;

27 the mapping recorder includes a computer having graphics-producing
28 capability for mapping positions of the mapping probe on a graphic map for
29 communication to a computer printer for computer printout;

30 the mapping recorder includes a computer monitor having graphics -
31 display capability for displaying graphics produced by the computer.

32 the mapping probe includes a TV camera with appropriate lighting for
33 video transmission of physical conditions and structure of the main pipeline and the
34 lateral pipeline;

35 the mapping recorder includes an on-site TV monitor for displaying the
36 physical conditions and structure of the main pipeline and the lateral pipeline;

37 the base vehicle includes a TV camera with appropriate lighting for
38 video transmission of physical conditions and structure of the main pipeline and the
39 lateral pipeline in addition to video transmission of the mapping probe;

40 the mapping recorder includes an on-site TV monitor for displaying the
41 physical conditions and structure of the main pipeline and the lateral pipeline in
42 addition to the mapping probe;

43 the base vehicle includes a probe manipulator from which the probe
44 conveyor is extendable into the lateral pipeline from the base vehicle;

45 the base vehicle includes a TV camera with appropriate lighting for
46 video transmission of physical conditions and structure of the main pipeline and the
47 lateral pipeline in addition to video transmission of the mapping probe;

48 the mapping recorder includes an on-site TV monitor for displaying the
49 physical conditions and structure of the main pipeline and the lateral pipeline in
50 addition to the mapping probe; and

51 the probe manipulator has electronic manipulation controls that are
52 operable remotely with a probe controller for controlling activity of the mapping
53 probe selectively in relation to video display on the on-site TV monitor.

19. The pipeline mapping system of claim 18 wherein:

2 the vehicle motor includes a vehicle water jet to which pressurized
3 water is supplied from a water conveyance having an inlet end proximate a motor
4 end of the base vehicle; and

5 the vehicle water jet has jet-nozzle structure and position to dislodge
6 visual obstruction from internal periphery of the main pipeline.

1 **20.** The pipeline mapping system of claim 18 wherein:

2 the probe motor includes a probe water jet to which pressurized water
3 is supplied from a water conveyance having an inlet end proximate the motor end
4 of the base vehicle; and

5 the probe water jet has jet-nozzle structure and position to dislodge
6 visual obstruction from internal periphery of the lateral pipeline.

1 **21.** A method for using a pipeline mapping system having a mapping probe
2 on a probe conveyor that is extendable into a lateral pipeline from a base vehicle in
3 a main pipeline; the base vehicle has a vehicle motor for propulsion of the base
4 vehicle in the main pipeline selectively; the probe conveyor has a probe motor for
5 propulsion of the probe conveyor with the mapping probe thereon in the lateral
6 pipeline; and a mapping recorder in electronic communication with the mapping
7 probe from a predetermined remote position for recording predetermined mapping
8 information from the mapping probe;

9 the method comprising the following steps:

10 placing the base vehicle containing the mapping probe on the
11 probe conveyor in the main pipeline;

12 moving and positioning the base vehicle in the main pipeline
13 selectively;

14 probing position and condition of the main pipeline;

15 communicating position and condition of the main pipeline from
16 the mapping probe to the mapping recorder;

17 detecting at least one lateral-pipeline connection of at least one
18 lateral pipeline to the main pipeline.
19 communicating position and condition of the lateral-pipeline
20 connection from the mapping probe to the mapping recorder;
21 inserting the probe conveyor and the probe into the lateral pipeline selectively;
22 probing position and condition of the lateral pipeline;
23 communicating position and condition of the lateral pipeline from
24 the mapping probe to the mapping recorder; and
25 mapping the condition and the location of the main pipeline and
26 of the lateral pipeline with the mapping recorder.

1 **22.** A method for using a pipeline-mapping system having:

2 a mapping probe on a probe conveyor that is extendable into a lateral
3 pipeline from a base vehicle in a main pipeline; the base vehicle has a vehicle motor
4 for propulsion of the base vehicle in the main pipeline selectively; the probe
5 conveyor has a probe motor for propulsion of the probe conveyor with the mapping
6 probe thereon in the lateral pipeline; a mapping recorder in electronic
7 communication with the mapping probe from a predetermined remote position for
8 recording predetermined mapping information from the mapping probe; the mapping
9 probe includes a predetermined metallic mass; the mapping recorder includes a
10 predetermined metal locator for marking position of the mapping probe from above
11 ground in which the mapping probe is positioned; the base vehicle includes a
12 predetermined metallic mass; the mapping recorder includes a predetermined metal
13 locator for marking position of the base vehicle from above ground in which the

14 base vehicle is positioned; the mapping probe includes a predetermined electronic
15 emitter; the mapping recorder includes a predetermined electronic receiver for
16 marking position of the mapping probe from above ground in which the mapping
17 probe is positioned; the base vehicle includes a predetermined electronic emitter; the
18 mapping recorder includes a predetermined electronic receiver for marking position
19 of the base vehicle from above ground in which the base vehicle is positioned; the
20 mapping recorder includes a computer having graphics-producing capability for
21 mapping positions of the mapping probe on a graphic map for communication to a
22 computer printer for computer printout; the mapping recorder includes a computer
23 monitor having graphics-display capability for displaying graphics produced by the
24 computer; the mapping probe includes a TV camera with appropriate lighting for
25 video transmission of physical conditions and structure of the main pipeline and the
26 lateral pipeline; the mapping recorder includes an on-site TV monitor for displaying
27 the physical conditions and structure of the main pipeline and the lateral pipeline; the
28 base vehicle includes a TV camera with appropriate lighting for video transmission
29 of physical conditions and structure of the main pipeline and the lateral pipeline in
30 addition to video transmission the mapping probe; the mapping recorder includes an
31 on-site TV monitor for displaying the physical conditions and structure of the main
32 pipeline and the lateral pipeline in addition to the mapping probe; the base vehicle
33 includes a probe manipulator from which the probe conveyor is extendable into the
34 lateral pipeline from the base vehicle; the base vehicle includes a TV camera with
35 appropriate lighting for aiding video transmission of physical conditions and
36 structure of the main pipeline and the lateral pipeline in addition to video
37 transmission of the mapping probe; the mapping recorder includes an on-site TV

38 monitor for displaying the physical conditions and structure of the main pipeline and
39 the lateral pipeline in addition to the mapping probe; and the probe manipulator has
40 electronic manipulation controls that are operable remotely with a probe controller
41 for controlling activity of the mapping probe selectively in relation to video display
42 on the on-site TV monitor;

43 the method comprising the following steps:

44 placing the base vehicle containing the mapping probe which
45 includes the TV camera and appropriate lighting on the probe conveyor
46 in the main pipeline;

47 moving and positioning the base vehicle in the main pipeline
48 selectively;

49 visually observing interior condition and structure of the main
50 pipeline on the TV monitor while map-survey probing position and
51 condition of the main pipeline with the mapping probe;

52 communicating position and condition of the main pipeline from
53 the mapping probe to the mapping recorder;

54 detecting at least one lateral-pipeline connection of at least one
55 lateral pipeline to the main pipeline;

56 visually observing interior condition and structure of the lateral-
57 pipeline connection on the TV monitor while map-survey probing
58 position and condition of the lateral-pipeline connection with the
59 mapping probe;

60 communicating position and condition of the lateral-pipeline
61 connection from the mapping probe to the mapping recorder;

62 inserting the probe conveyor and the probe into the lateral
63 pipeline selectively;

64 visually observing interior condition and structure of the lateral
65 pipeline on the TV monitor while probing position and interior
66 condition of the lateral pipeline with the mapping probe;

67 communicating position and condition of the lateral pipeline from
68 the mapping probe to the mapping recorder; and

69 mapping the condition, physical structure and location of the
70 main pipeline and of the lateral pipeline with the mapping recorder
71 selectively.

23. The method of claim 22 wherein:

the vehicle motor includes a vehicle water jet to which pressurized
water is supplied from a water conveyance having an inlet end proximate a motor
end of the base vehicle; and the vehicle water jet has jet-nozzle structure and
position to dislodge visual obstruction from internal periphery of the main pipeline;
and

comprising the additional step of:

selectively flushing a portion of the main pipeline before visually
observing interior condition and structure of the main pipeline and the
lateral-pipeline connection on the TV monitor.

1 **24.** The method of claim **22** wherein:

2 the probe motor includes a probe water jet to which pressurized water
3 is supplied from a water conveyance having an inlet end proximate a motor end of
4 the base vehicle; and the probe water jet has jet-nozzle structure and position to
5 dislodge visual obstruction from internal periphery of the lateral pipeline; and

6 comprising the additional step of:

7 selectively flushing a portion of the lateral pipeline before
8 visually observing interior condition and structure of the lateral
9 pipeline.

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